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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09,297,483	07/19/1999	SHUNICHI SEKI	005317-20009	9831

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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT PAPER NUMBER

1762

DATE MAILED: 02/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/297,483

Applicant(s)

SEKI ET AL.

Examiner

Michael Cleveland

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 37-49, 51, 53, 54, 56 and 62-128 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37-49, 51, 53, 54, 56 and 62-128 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 53-54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 53-54 recite "The organic EL element of claim 37...". However, claim 37 is a manufacturing process, not an organic EL element. It is thus unclear whether claims 53-54 are intended as claims which further limit the process or if they are intended as product-by-process claims. Given that the new product claims (113-128) cover the product-by-process (In fact, if claims 53-54 are product claims, then claims 127-128 are exactly identical in scope with them.), the examiner suggests modifying the preambles of claims 53-54 to recite "The manufacturing process of claim 37...".

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 53 and 113-127 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (U.S. Patent 5,725,407, hereafter '407) in view of Cao (U.S. Patent 5,965,281, hereafter '281) and Jonas '515.

Claim 113: '407 teaches a manufacturing process of an EL device, comprising the steps of forming partitioning members (2) on a substrate having openings corresponding to pixels on a substrate, and filling the opening with an anode material (3) (i.e., a hole injecting and transporting layer).

'407 does not teach that the EL device is an organic device, that a hole-transporting layer is filled from an ink-jet printhead using PEDT and PSS and a solvent on top of the anode and

drying the composition. '407 also does not teach the deposition of a cathode on the luminescent layer.

'407 teaches the use of inorganic phosphors to form the EL device. However, the use of organic electroluminescent material to form similar EL devices is extremely well known in the art. See, for instance, '281 (Abstract). '407 uses an ITO anode formed by sputtering (col. 3, lines 11-16). However, other anode materials are very well known in the art. For instance, '281 teaches that a bilayer anode comprising ITO overcoated with a layer of PEDT doped with PSS may be used as the anode instead of ITO (col. 15, lines 34-59). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used organic EL material rather than inorganic phosphors and an ITO/PEDT-PSS bilayer anode instead of the ITO anode with the expectation of similar results. '407 teaches the manufacture of a cathode ray tube or a plasma display screen, in which an external element, such as an electron gun or a series of electron emitters acts as the cathode. However, the use of electroluminescent devices in which a cathode layer is deposited directly on the anode/luminescent stack are equally well known. See, for instance, Cao '281, col. 6, lines 23-34. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the cathode layer of '281 instead of relying on a cathode ray or bank of electron-emitters with a reasonable expectation of success and with the expectation of similar results because such is another known embodiment of supplying electrons in display panels.

'281 does not describe a method of depositing a polythiophene film. '515 teaches that a polythiophene films suitable for deposition as electrodes in EL devices (col. 3, lines 5-67) are formed using compositions including PEDT and PSS and a solvent (Example and claims 1 and 3). '515 teaches that such compositions may be applied by liquid coating methods including printing methods (col. 2, lines 51-57). Although ink-jet printing is not explicitly disclosed, ink-jet printing is a notoriously well-known printing method. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ink-jet printing to have deposited the polythiophene film in the EL device suggested by '407 and '281 with a reasonable expectation of success. Further, it would have been obvious to one of ordinary skill in the art at the time the invention was made that such a method would have simplified the process. The method of '407 indicates that the anode layer is deposited uniformly over the partition walls and then selectively removed from the tops of the partitions in order to isolate the electrodes within each opening. However, ink-jet printing is a well-known method of supplying material to selected locations. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used ink-jet printing to have selectively deposited

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anode material in each opening in order to have made the process more efficient by eliminating the selective removal step. The same logic applies to the luminescent layers, especially because different colors are desired. '515 teaches that the applied film is then dried (col. 2, lines 51-57). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have dried the film after depositing it.

Claims 113, 126: Although the method does not explicitly teach the use of a lubricant, the product appears to be identical without the use of the lubricant, in the absence of a showing of unexpected results.

Claims 114-120: Although the method does not explicitly teach the use of particular concentrations, contact angles, viscosities, and surface tensions of the coating solutions, the product appears to be identical regardless of the physical properties of the solution used to deposit the layers.

Claims 121-125: The solvent may be polar solvents, such as water, or water mixed with lower alcohols, such as ethanol ('515, col. 2, lines 11-16). However, the identity of the solvent does not appear to materially affect the dried product, and therefore the product appears to be identical regardless of which solvent is used to deposit the layers.

Claims 53, 127: Thicknesses of less than 1 micron are taught in '515, col. 3, lines 66-67.

5. Claims 37-49, 51, 53, 56, and 62-81, 83-96, 98-111, and 113-127 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu '407 in view of Cao '281 and Jonas '515 and further in view of Taniguchi et al. (U.S. Patent 5,667,572).

Claims 37, 48-49, 51, 56, 64-67, 78-80, 93-95, 108-110, 124-126: '407, '281, and '515 are discussed above. '515 teaches that the solvent for the polythiophene (i.e., an ionic polymer) dispersion (i.e., ink) may be a mixture of water with water-miscible solvents, but none of the references suggest ethoxyethanol, diethylene glycol, or glycerin.

'572 teaches the preparation of inks that contain ionic polymers (col. 8, lines 13-32) may be made in mixtures containing water-miscible organic solvents, such as glycerin, diethylene glycol and ethoxyethanol (col. 7, lines 31-57). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such water-miscible solvents as ethoxyethanol, diethylene glycol, or glycerin as the solvents mixed with water in the polythiophene inks of '515 with the expectation of similar results.

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Claims 38-44, 68-74, 83-89, 98-104, 114-120: The Examiner takes Official Notice that factors such as the flowability of an ink and its wetting ability on a surface are well known parameters in coating processes. The flowability and wetting ability are controlled by the viscosity, surface tension, and contact angle with any dispensing nozzle of the solution. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the viscosity, surface tension, and contact angle with the ink-jet nozzle for the optimum flow and wetting properties. The composition of Example 1 of '515 has a weight percent within Applicant's claimed ranges (about 0.5 %).

Claims 45-47, 75-77, 90-92, 105-107, 121-123: The solvent may be polar solvents, such as water, or water mixed with lower alcohols, such as ethanol ('515, col. 2, lines 11-16).

Claims 53, 81, 96, 111, 127: Thicknesses of less than 1 micron are taught in '515, col. 3, lines 66-67.

Claims 62-63: The electroluminescent elements form a luminescent screen, and are therefore incorporated in a luminescent display.

6. Claims 54, 82, 97, 112, and 128 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu '407 in view of Cao '281 and Jonas '515 and further in view of Jonas '483.

'407, '281 and '515 are discussed above but do not explicitly teach surface resistances within Applicant's claimed ranges. However, Jonas '483 indicates that similar polythiophene films to Jonas '515 can be printed with surface resistances of  $10^{10}$  to 0.1 ohm/square (col. 4, lines 35-36), which overlaps Applicant's claimed range. The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

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7. Claims 54, 82, 97, 112, and 128 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu '407 in view of Cao '281, Jonas '515, and Taniguchi '572 and further in view of Jonas '483 for the same reasons given above.

### ***Response to Arguments***

8. Applicant's arguments filed 5/30/02 and 6/27/02 have been fully considered but they are not persuasive.

Applicant's arguments regarding the use of a hole-injecting and transporting layer separate from the anode layer are unconvincing in view of Example 8 of Cao '281. Differences in terminology will not be found to overcome this teaching.

In response to applicant's arguments against the references, such as Jonas '483, individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant's states on p. 17 that the anode "failed to distinguish between the anode layer and the hole injecting and transporting layer". However, until now, no distinction was required. An anode layer injects and transports holes. Therefore, it is a hole injecting and transporting layer.

Applicant's arguments regarding the use of an ink-jet head is incorrect. The Examiner has given official notice that ink-jet printing is a notoriously well known printing method, and therefore suggested by Jonas. Applicant has not timely challenged the official notice, and therefore has conceded the point. Further, such has been demonstrated by the references already of record in the case. See, in particular, those cited in the rejection mailed 2/6/2000 (Paper No. 3).

### ***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shirasaki et al. (U.S. Patent 5,895,692) is cited for its teaching of ink-jet printing in an EL context. Woo et al. (U.S. Patent 6,169,163) is cited of interest for its teachings of the use of PEDT-PSS as a hole-transporting layer (col. 21, lines 10-20).

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10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703) 308-2331. The examiner can normally be reached on 9-5:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-3186 for regular communications and (703) 306-3186 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

*MB*

MBC  
February 13, 2003

  
**SHRIVE P. BECK**  
**SUPERVISORY PATENT EXAMINER**  
**ART UNIT CENTER 1700**